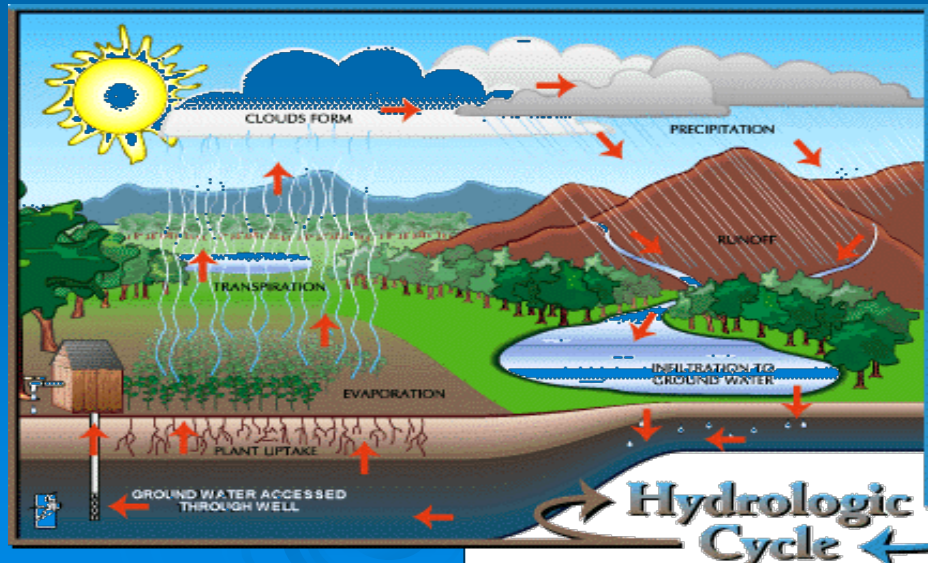


California Water Plan Update 2013 Groundwater Caucus Meeting

Groundwater Content Enhancement

Deliverable #1: Compile State, Federal, and Local Planning Activities



California Water Plan Update 2013 Groundwater Content Enhancement

Deliverable 1: Compile State, Federal, & Local Planning Activities

- ❑ 1.1 Groundwater Management Plans
- ❑ 1.2 CASGEM Groundwater Monitoring Plans
- ❑ 1.3 Integrated Regional Water Management Plans
- ❑ 1.4 Urban Water Management Plans
- ❑ 1.5 Agriculture Water Management Plans
- ❑ 1.6 Water Transfer Data
- ❑ 1.7 Groundwater Modeling Reports

California Water Plan Update 2013

Groundwater Content Enhancement

- ❑ Task 1.1
- ❑ Task 1.2
- ❑ Task 1.3
- ❑ Task 1.4
- ❑ Task 1.5
- ❑ Task 1.6
- ❑ Task 1.7

Task 1.1 Groundwater Management Plans

- ❑ **Purpose:** the planned and coordinated monitoring, operation, and administration of a groundwater basin with the goal of long-term sustainability of the resource.
- ❑ **Status:** 132 Plans, 112 Shape files
 - ❑ *Known of, but haven't found* 13
 - ❑ *Others we're not aware of* ?



California Water Plan Update 2013 Groundwater Content Enhancement

- ❑ Task 1.1
- ❑ Task 1.2
- ❑ Task 1.3
- ❑ Task 1.4
- ❑ Task 1.5
- ❑ Task 1.6
- ❑ Task 1.7

Task 1.2 California Statewide Groundwater Elevation Monitoring Plans

- ❑ **Purpose:** Statewide groundwater elevation monitoring program to track seasonal and long-term trends in groundwater elevations in CA groundwater basins.
- ❑ **Status: (As of 10/24/11)**
 - ❑ 407 NOTIFICATIONS RECEIVED BY DWR
 - ❑ 31 Designated Basins and Subbasins
 - ❑ 89 Conditionally Designated Basins and Subbasins
 - ❑ 287 Notifications Under Review



California Water Plan Update 2013

Groundwater Content Enhancement

- ❑ Task 1.1
- ❑ Task 1.2
- ❑ Task 1.3
- ❑ Task 1.4
- ❑ Task 1.5
- ❑ Task 1.6
- ❑ Task 1.7

Task 1.3 Integrated Regional Water Mgmt Plans

- ❑ **Purpose:** Collaborative effort to manage all aspects of water resources in a region.
- ❑ **Status:** 47 Plans (32 existing, 15 in development)

❑ North Coast	1	❑ Lahontan	3, 2	❑ Sacramento River	5, 3
❑ San Francisco Bay	1	❑ Santa Ana	1	❑ San Joaquin	4, 4
❑ Central Coast	6	❑ Colorado River	1, 2	❑ Tulare-Kern	3, 3
❑ Los Angeles-Ventura	3, 1	❑ San Diego	3	❑ Trans-Colorado-Lahontan	1



California Water Plan Update 2013

Groundwater Content Enhancement

- ❑ Task 1.1
- ❑ Task 1.2
- ❑ Task 1.3
- ❑ Task 1.4
- ❑ Task 1.5
- ❑ Task 1.6
- ❑ Task 1.7

Task 1.4 Urban Water Management Plans

- ❑ **Purpose:** Long-term resource planning to ensure adequate water supplies are available to meet existing and future water demands
- ❑ **Status:**
 - ❑ 343 UWMPs were submitted by Aug. 1, 2011, more expected
 - ❑ 38 have been reviewed; 8 have been approved
 - ❑ 70 plans that are in areas seeking IRWM funding, are being reviewed first



California Water Plan Update 2013

Groundwater Content Enhancement

- ❑ Task 1.1
- ❑ Task 1.2
- ❑ Task 1.3
- ❑ Task 1.4
- ❑ Task 1.5
- ❑ Task 1.6
- ❑ Task 1.7

Task 1.5 Agricultural Water Management Plans

- ❑ **Purpose:** Advance efficient water management through voluntarily planning, implementing, & evaluating specific irrigation practices.
- ❑ **Status:**
 - ❑ Plans due Dec. 31, 2012; updates due Dec. 31, 2015
 - ❑ Applies to agricultural water suppliers that provide water to > 25,000 acres.
 - ❑ In CA, about 46 entities deliver water to >25,000 acres...which represents more than 80% of agricultural water use.



California Water Plan Update 2013

Groundwater Content Enhancement

- ❑ Task 1.1
- ❑ Task 1.2
- ❑ Task 1.3
- ❑ Task 1.4
- ❑ Task 1.5
- ❑ **Task 1.6**
- ❑ Task 1.7

Task 1.6 Water Transfers

- ❑ **Purpose:** To improve the economic stability and environmental conditions that can deteriorate with water scarcity, by changing the way water is usually distributed.
- ❑ **Status:** Ongoing effort to compile data and reports concerning water transfers.



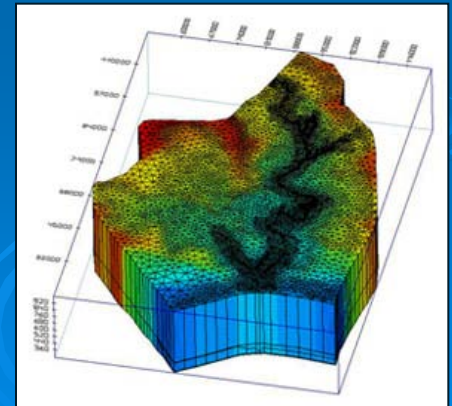
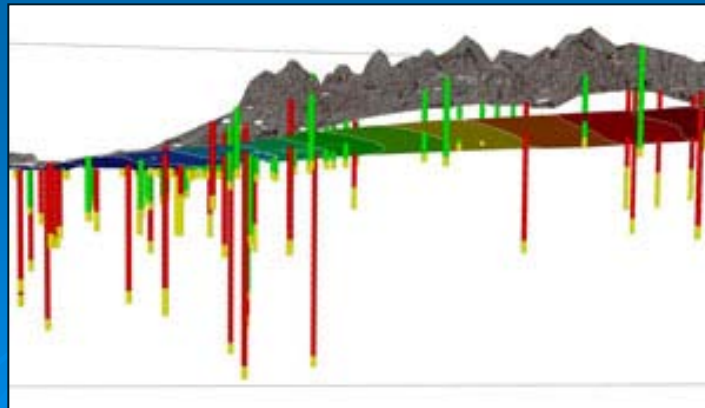
California Water Plan Update 2013

Groundwater Content Enhancement

- ❑ Task 1.1
- ❑ Task 1.2
- ❑ Task 1.3
- ❑ Task 1.4
- ❑ Task 1.5
- ❑ Task 1.6
- ❑ Task 1.7

Task 1.7 Groundwater Modeling

- ❑ **Purpose:** Evaluate surface water and groundwater flow interaction, water resources management, and water transfer practices, among others.
- ❑ **Status:** Ongoing effort to compile data and reports concerning groundwater modeling.



California Water Plan Update 2013 Groundwater Content Enhancement

Compiling the Data for Analysis

- Compiling Water Management Plans
- Comments from May Caucus
- Developing a Geographic Information System (GIS) Interface
- GIS Interface - Groundwater Management Plan Example

California Water Plan Update 2013

Groundwater Content Enhancement

Compiling Water Management Plans

- Easily Found Data - Plans Submitted to DWR by a Specific Due Date:
 - Integrated Regional Management Plans (IRWMPs)
 - CA Statewide Groundwater Elevation Monitoring Plans (CASGEM)
 - Urban Water Management Plans (UWMPs)
 - Agricultural Water Management Plans (AWMPs)

- Harder to Find Data:
 - Groundwater Management Plans (GWMPs) –
 - not required to be submitted to DWR
 - Water Transfer Data
 - Groundwater Modeling Data

California Water Plan Update 2013

Groundwater Content Enhancement

Comments from May Caucus

- Feedback mostly pertained to Deliverable 2 - Summarizing Groundwater Conditions and Management Activities
- Questions posed of Deliverable 1 that would provide meaningful information for Deliverable 2:
 - How will the data be compiled? How do we identify data gaps?
 - Where are water management plans located throughout the State?
 - How much of the State is covered by water management plans?
 - What types of boundaries should be used in the groundwater summaries?
 - Political: City, County, Irrigation & Water Districts?
 - Physical: Hydrologic Regions, Basin and Sub-Basin, Aquifer, Watershed and Sub-Watershed Boundaries?

Answer: Geographic Information System Project that incorporates all aspects of groundwater management

California Water Plan Update 2013 Groundwater Content Enhancement

Developing a Geographic Information System (GIS) Interface

- Collect plans and shapefiles (geographic boundaries)
- Determine correct plan boundaries
- Bring files into a GIS project
- Look for problems that could skew calculations:
 - Overlapping boundaries
 - Data gaps
 - Shape files projected in different coordinate systems
 - Other?

California Water Plan Update 2013

Groundwater Content Enhancement

GIS Project - Groundwater Management Plan Example

- Hydrologic Region
 - North Coast 1
 - Sacramento Region 27
 - North Lahontan 3
 - San Francisco 2
 - San Joaquin 15
 - Central Coast 7
 - Tulare Lake 24
 - South Lahontan 5
 - South Coast 24
 - Colorado River 4
- 112 Shapefiles - 132 GWMPs (20 missing shape files)

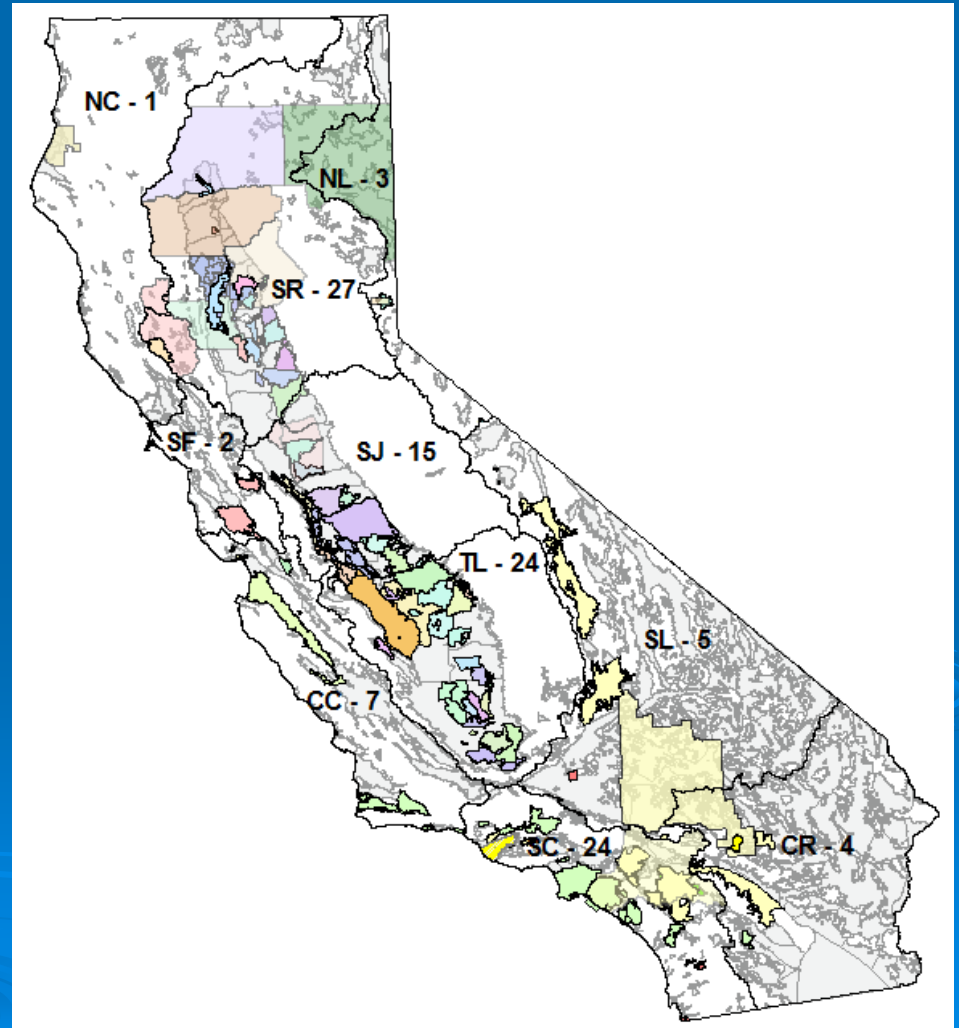


California Water Plan Update 2013 Groundwater Content Enhancement

GIS Project - Groundwater Management Plan Example

Groundwater Management Plan Shape Files

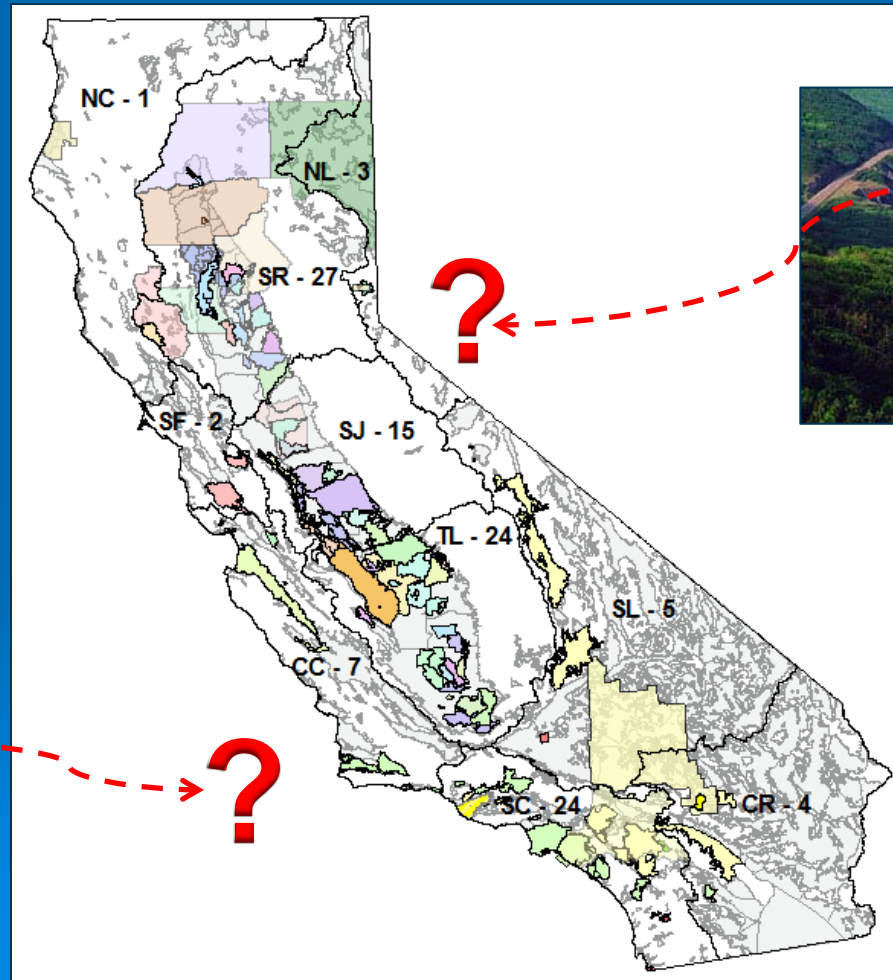
112 shape files are projected on the map, out of the 132 GWMPs that were collected equals 20 missing shape files to track down



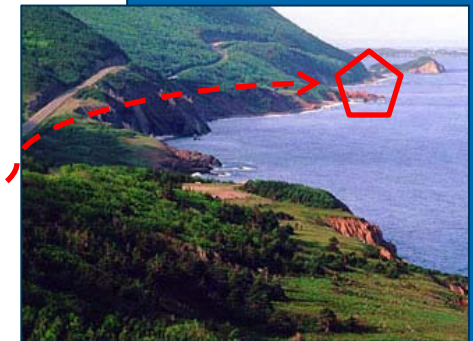
California Water Plan Update 2013 Groundwater Content Enhancement

GIS Project - Groundwater Management Plan Example

- Shape File Placement Errors associated with wrong coordinate system



Nova Scotia



Fiji Islands

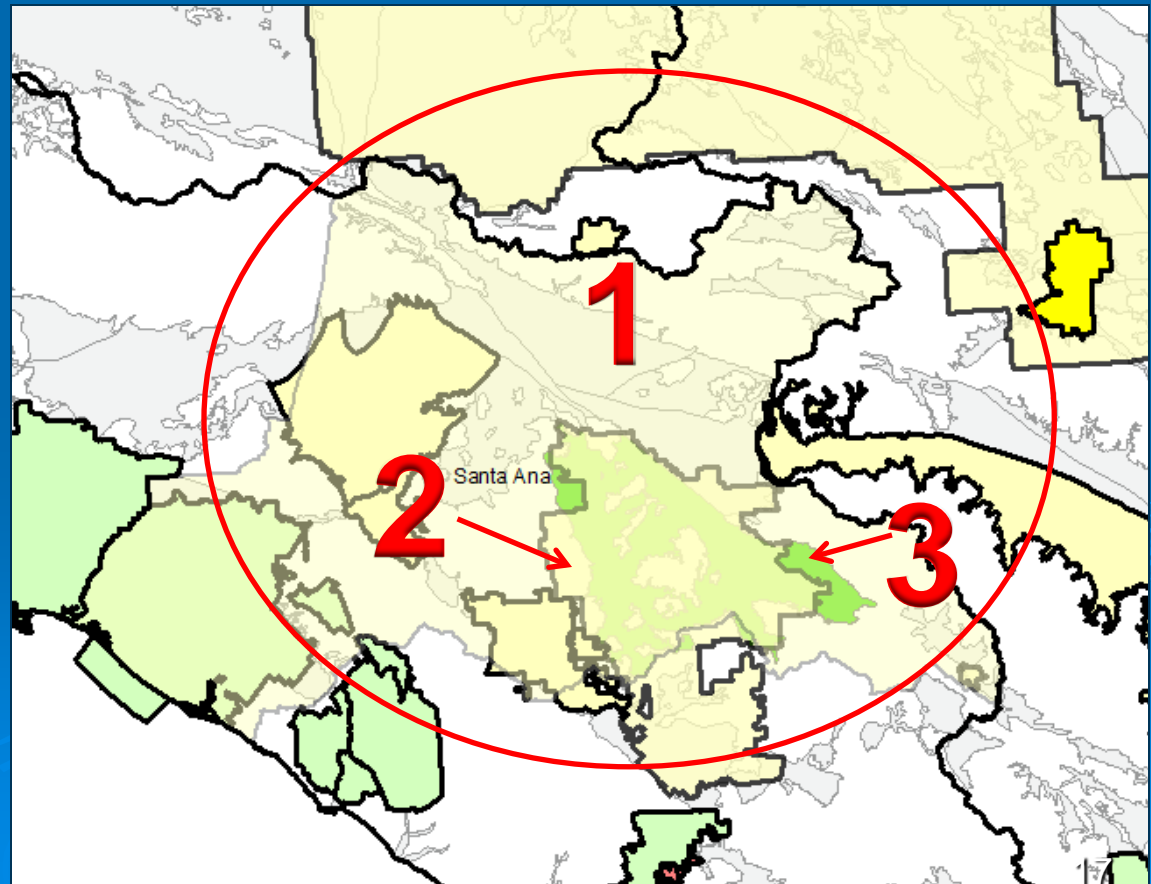


California Water Plan Update 2013 Groundwater Content Enhancement

GIS Project - Groundwater Management Plan Example

- Overlapping GWMPs: problem when calculating how many acres of California's groundwater basins are covered by a GWMP

- 1-Santa Ana Sub-Region
- 2-Eastern Municipal WD
- 3-San Jacinto Basin

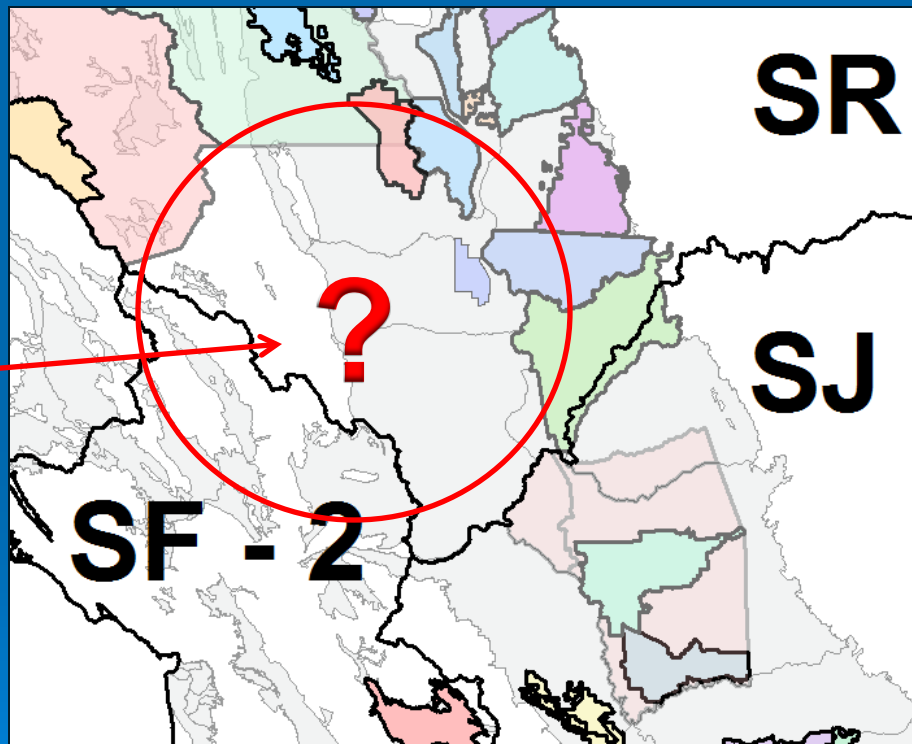


California Water Plan Update 2013 Groundwater Content Enhancement

GIS Project - Groundwater Management Plan Example

- ❑ Missing GWMP shape files or plans?

GWMPs in Solano
Area?



California Water Plan Update 2013 Groundwater Content Enhancement

Deliverable 1: Compile State, Federal, & Local Planning Activities –Summary to Date

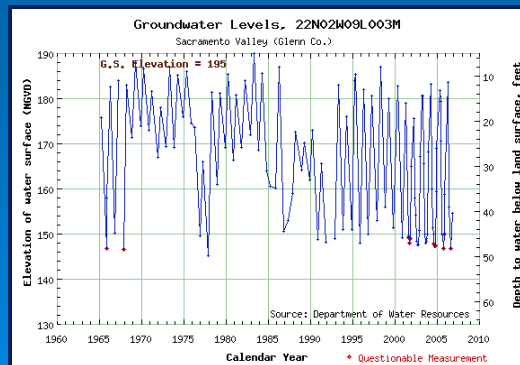
□ 1.1	Groundwater Management Plans	132
□ 1.2	CASGEM Groundwater Monitoring Plans	407
□ 1.3	Integrated Regional Water Management Plans	47
□ 1.4	Urban Water Management Plans	343
□ 1.5	Agriculture Water Management Plans	ongoing
□ 1.6	Water Transfer Data	ongoing
□ 1.7	Groundwater Modeling Reports	ongoing

California Water Plan Update 2013 Groundwater Caucus

Groundwater Content Enhancement

Deliverable #2:

Summarizing Groundwater Conditions and Management Activities



November 10, 2011



Deliverable #2:

Summarize Groundwater Conditions and Management Activities

Main Tasks:

- 2.1 Provide brief physical description of the regional aquifer systems
- 2.2 Provide a general overview and status of the regional aquifer conditions
- 2.3 Provide a general overview and status of groundwater management activities.



GW Content: *In Scope/Out of Scope*

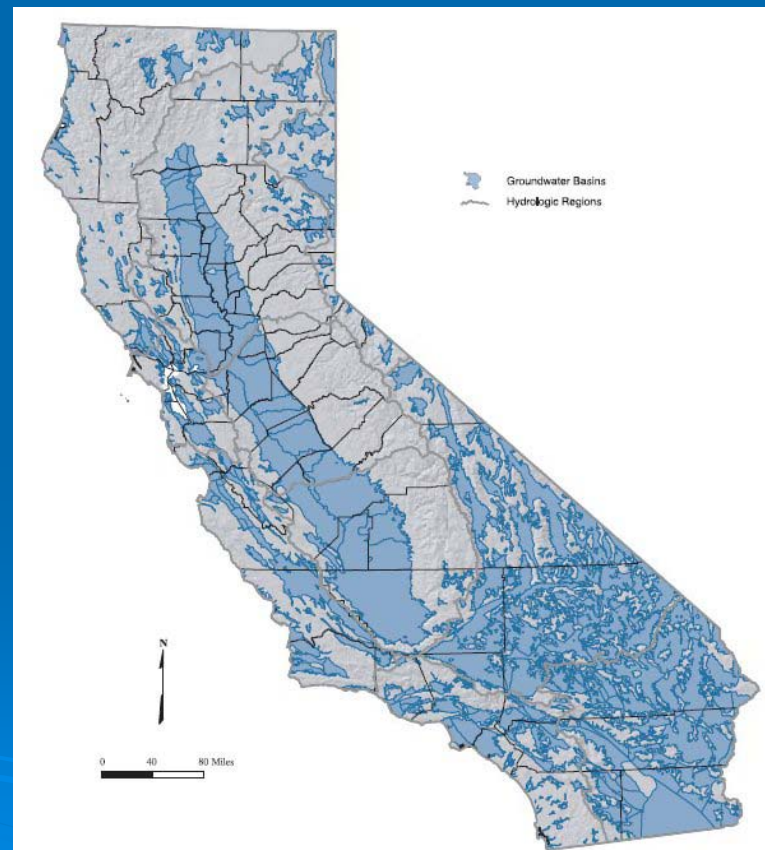
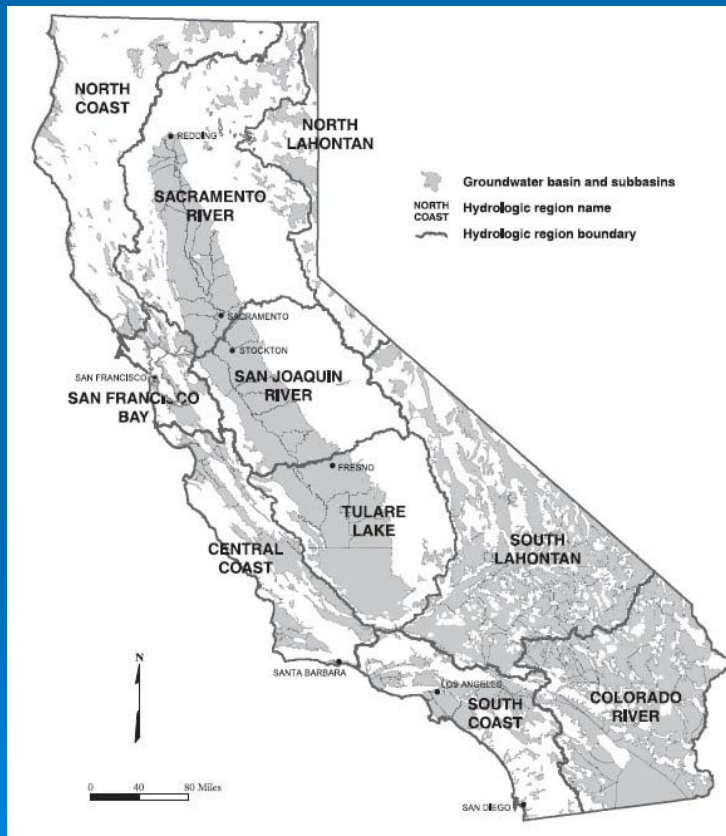
Project Scope:

In Scope: <i>List areas and functionality included in project.</i>	Out of Scope: <i>List areas and functionality <u>not</u> included in project.</i>
<ul style="list-style-type: none">• Integration of groundwater information from various State, federal, regional, and local planning activities; narratives on regional groundwater conditions and management activities; quantification of annual change in groundwater storage; and identification of data gaps.• Case Studies with detailed groundwater budgets for selected groundwater basins.• Inventory and identification of potential for conjunctive management, groundwater banking, and integrated flood management.• Preliminary sustainability indicators for groundwater quantity and quality.	<ul style="list-style-type: none">• Additional investigation or data collection.• Updated basin and subbasin groundwater budget type classification; and any new detailed groundwater budgets for planning areas, basins, or subbasins in the state.• Any new detailed analysis of groundwater quality conditions.• Any new detailed analysis of the rate and volume of groundwater extraction by planning area, basin, or subbasin.• Any new detailed evaluation of long-term decline in groundwater storage by planning area, basin, or subbasin.• Evaluation of subsidence potential of a planning area, basin, or subbasin.• An extensive analysis on sustainability indicators for groundwater quantity and quality.

Deliverable #2:

Feedback from May 19th Caucus

Question: How would you organize, synthesize and report the groundwater content that is developed?



Deliverable #2:

Feedback from May 19th Caucus

Question: How would you organize, synthesize and report the groundwater content that is developed?

Feedback:

- Use Physical rather than Political boundaries.
 - Watershed, sub-watershed...*ground-watershed*
- Drill down by Region, then IRWM, then resource or issue.
 - Water Source...SW, GW, imported, area of origin
 - Groundwater Levels
 - Groundwater Quality
 - Subsidence Susceptibility
 - Recharge areas
- Need overlays of IRWMs, UWMPs, CASGEM plans by region or basin

Deliverable #2:

Feedback from May 19th Caucus

Question: How would you organize, synthesize and report the groundwater content that is developed?

General Content Feedback:

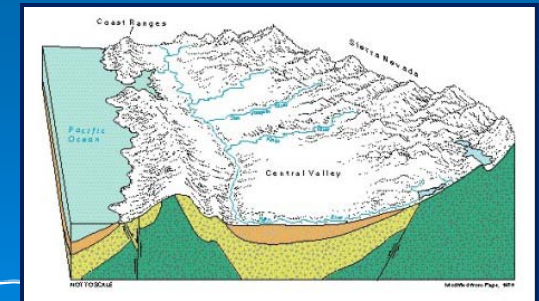
- Consider and characterize scalability of data...
- Make sure Management Activities include existing projects.
- Include State and Federal data collection and management.
- Include groundwater quality challenges and management efforts by the Water Board, USGS, DPH, etc.
- Report results of Low Impact Development (LID) practices.
- Consider use of Internet Portal with GIS interface or Google Wiki interactive site for reporting and sharing information.

**CALIFORNIA GROUNDWATER UPDATE
CWP 2013 Groundwater Content Enhancement**

**DRAFT
Report Outline**

1. INTRODUCTION
2. FINDINGS
3. RECOMMENDATIONS
4. METHODS and ASSUMPTIONS (...CONCEPTS & LIMITATIONS?)
5. STATEWIDE GROUNDWATER UPDATE
6. HYDROLOGIC REGION GROUNDWATER UPDATE
 - 6.1. North Coast Hydrologic Region
 - 6.2. San Francisco Hydrologic Region
 - 6.3. Central Coast Hydrologic Region
 - 6.4. South Coast Hydrologic Region
 - 6.5. Sacramento River Hydrologic Region
 - 6.6. San Joaquin River Hydrologic Region
 - 6.7. Tulare Lake Hydrologic Region
 - 6.8. North Lahontan Hydrologic Region
 - 6.9. South Lahontan Hydrologic Region
 - 6.10. Colorado River Hydrologic Region
 - 6.11. Sacramento-San Joaquin Delta
 - 6.12. Mountain Counties Area
7. REFERENCE
8. GLOSSARY
9. APPENDIX
 - 9.1. Change in Storage Technical Memorandum.

**CWP 2013
GW Content
Enhancement Report
Draft Outline
and
Report Organization**



5. STATEWIDE GROUNDWATER UPDATE

5.1. Physical Description of Statewide Aquifer Systems

5.1.1. Alluvial Aquifers

5.1.1.1. Priority Basins (GAMA, CASGEM, State Board)

5.1.2. Fractured-Rock Aquifers

5.2. Statewide Groundwater Conditions

5.2.1. Groundwater Supply

5.2.1.1. Well Distribution

5.2.1.2. Well Type

5.2.2. Groundwater Use

5.2.2.1. Urban

5.2.2.2. Agricultural

5.2.2.3. Managed Wetlands

5.2.3. Groundwater Monitoring

5.2.3.1. Groundwater Level Monitoring

5.2.3.2. Data Presentation (h-graphs, dot & contour maps)

5.2.3.3. Satellite Monitoring (GRACE)

5.2.3.4. Land Subsidence Monitoring

5.2.4. Aquifer Response

5.2.4.1. Local versus Regional (discussion regarding scale & variability)

5.2.4.2. Aquifer Response by Use (Urban, Agriculture, Managed Wetlands)

5.2.4.3. Seasonal Response versus Long-Term Trends (intro change in storage)

5.2.4.4. Change in Storage

5.2.5. Groundwater Budget (summary of budget from above data)

5.3. Statewide Groundwater Management

5.3.1. Groundwater Management Overview

5.3.1.1. Groundwater Management Plans

5.3.1.2. Groundwater Ordinances

5.3.1.3. Groundwater Level Monitoring Plans (CASGEM)

5.3.1.4. Groundwater Quality Monitoring Programs

5.3.1.5. Subsidence Monitoring Programs

5.3.1.6. Groundwater Recharge Programs

5.3.2. Case Studies of Groundwater Mgmt Strategies

5.4. Integrated (multibenefit) Groundwater Management Opportunities

5.4.1. Conjunctive Management

5.4.2. Integrated Flood Management and Groundwater Banking

5.5. Groundwater Data Gap Analysis

5.6. Statewide Groundwater Sustainability (score card?)

CWP 2013 GW Content Enhancement Report Draft Outline and Report Organization



Hydrologic Region

1. Summary and Recommendations

- 1.1. Setup/Summary
- 1.2. Resource Management Strategies and Policies
- 1.3. Finance
- 1.4. Water Planning and Governance
- 1.5. Integrated Regional Water Management Policy and Standards

2. Current State of the Region

- 2.1. Setting
- 2.2. Watersheds
- 2.3. Groundwater Aquifer Descriptions
- 2.4. Ecosystems
- 2.5. Climate
- 2.6. Demographics
- 2.7. Land Use Patterns
- 2.8. Tribal Communities

3. Regional Resource Management Conditions

- 3.1. Water in the Environment
- 3.2. Water Governance
- 3.3. Water Supplies
- 3.4. Water Uses
- 3.5. Project Operations
- 3.6. Surface Water Quality
- 3.7. Groundwater Quality
- 3.8. Aquifer Conditions and Issues
- 3.9. Near-Coastal Issues
- 3.10. Flood Management

4. Current Relationships with Other Regions and States

- 4.1. Implementation Activities (2009-2013)
- 4.2. Drought Contingency Plans
- 4.3. Resource Management Strategies
- 4.4. Water Governance
- 4.5. State Funding Received
- 4.6. Local Investment
- 4.7. Water Conservation Act of 2009 (SBx7-7) Implementation Status and Issues
- 4.8. Interregional and Interstate Activities

5. Looking to the Future

CWP 2013 Regional Report Draft Outline and Organization

How do the two
reports fit together?



CALIFORNIA GROUNDWATER UPDATE

CWP 2013 Groundwater Content Enhancement

Annotated Report Outline

Prior to the Introduction Section we will need to include the following report sections:

- Acronyms and Abbreviations
- Table of Contents
- Report Author Breakdown/DWR Organization Page

1. INTRODUCTION

This section will be developed primarily by Dan and Abdul, with assistance from CWP program managers and publications staff.

1.1. Overview of Historical Groundwater Content in CWP

This section provides a short overview of the groundwater content in previous CWPs, request for expanded groundwater coverage, the recognized need for additional groundwater information for regional planning efforts, the ongoing implementation of the 2009 Water Conservation legislation, and the decision to initiate efforts to enhance groundwater content in CWP 2013 update.

1.2. Scope, Intent, and Process Behind the Groundwater Update

This section provides explanation of the overall scope associated with the groundwater content enhancement, the intent and reasoning behind providing the groundwater information as a separate groundwater document (not enough room in the Regional Reports to provide full explanation of the methods, assumptions, and details associated with the data). Need to recognize that due to limited resources and availability of data, this will be an iterative process. Need to recognize that the identified data gaps are meant to help serve as a guidepost to focus future data collection and funding efforts...and highlight the importance of developing consistent baseline data funding. Include much of the information in the project management *Scoping and Integration* document. Explain the process and outreach methods that were used to compile information. Recognize all of the groups and stakeholders that contributed to this effort (PAC, GW Caucus, Regional Forums, GRA, ACWA, etc.)

1.3. Report Organization

This Section provides a basic overview of the five main sections of the report (Findings, Recommendations, Methods & Assumptions, Statewide Update, Regional Report Updates).

CWP 2013 GW Content Enhancement Annotated Outline

Project Schedule & Timeline

Schedule from May GW Caucus:

Schedule:

- | | |
|--|---------------|
| ◆ Revise Project Charter based on Public AC feedback: | Spring 2011. |
| ◆ Form Groundwater Caucus: | May 19, 2011. |
| ◆ Compile and summarize information, and identify data gaps: | Late 2011. |
| ◆ Conduct analysis and prepare draft document: | Spring 2012. |
| ◆ Refine analysis and document: | Spring 2013. |
| ◆ Finalize analysis and document: | Fall 2013. |

Needed to make some adjustments



Important Timeline Information



GW Content Risks, Assumptions, Constraints

Risks: *What characteristics or situations could cause this project to fail? Identify those items which are outside the jurisdiction of project and could result in a “show-stopper” to the project success. Create a short list.*

- Limited data (the amount of information available is generally greatest in northern California and tends to be more limited to the south except the adjudicated basins in the south).
- Political sensitivity associated with the use of and access to groundwater data.
- Delays associated with data identification, acquisition, evaluation, analysis, and synthesis.
- The continued, focused coordination necessary to facilitate the work done by a large group of staff.
- Departure of key staff.
- Limitations in Water Plan funding that may prevent full project implementation.

Assumptions and Constraints: *What assumptions were made in defining project? Are there constraints to the execution of project? List assumptions and constraints.*

Assumptions:

- Existing water laws and regulations are in place.
- Project deliverables are based on the best existing and available data, information, and analyses.
- Water Plan Program Manager views this project as a high priority.
- Water Plan funding is available to dedicate staff in the Headquarter and the Regional Offices to work on the project.
- Staff in the Headquarter and the Regional Offices is available to work on the project on a priority basis for duration of Water Plan Update 2013.
- No turnover in key staff.

Constraints:

- Concurrent demands on the times of key staff by other projects

Deliverable #2:

Summarize Groundwater Conditions and Management Activities

Task 2 Status:

2.1 Physical description of the regional aquifers

- First draft will primarily utilize Bulletin 118 description.
- Second draft will include additional information from GWMPs, project studies, and Regional Forum feedback.

2.2 Overview and status of regional aquifer conditions

- Selected key well hydrographs for most hydrologic regions.
- Analyzing change in storage by County, DAU, & subbasin.
- Coordinating with ACWA and Regional Forums on potential problem areas (subsidence, quality, quality)
- Developing indicators of groundwater sustainability

Deliverable #2:

Summarize Groundwater Conditions and Management Activities

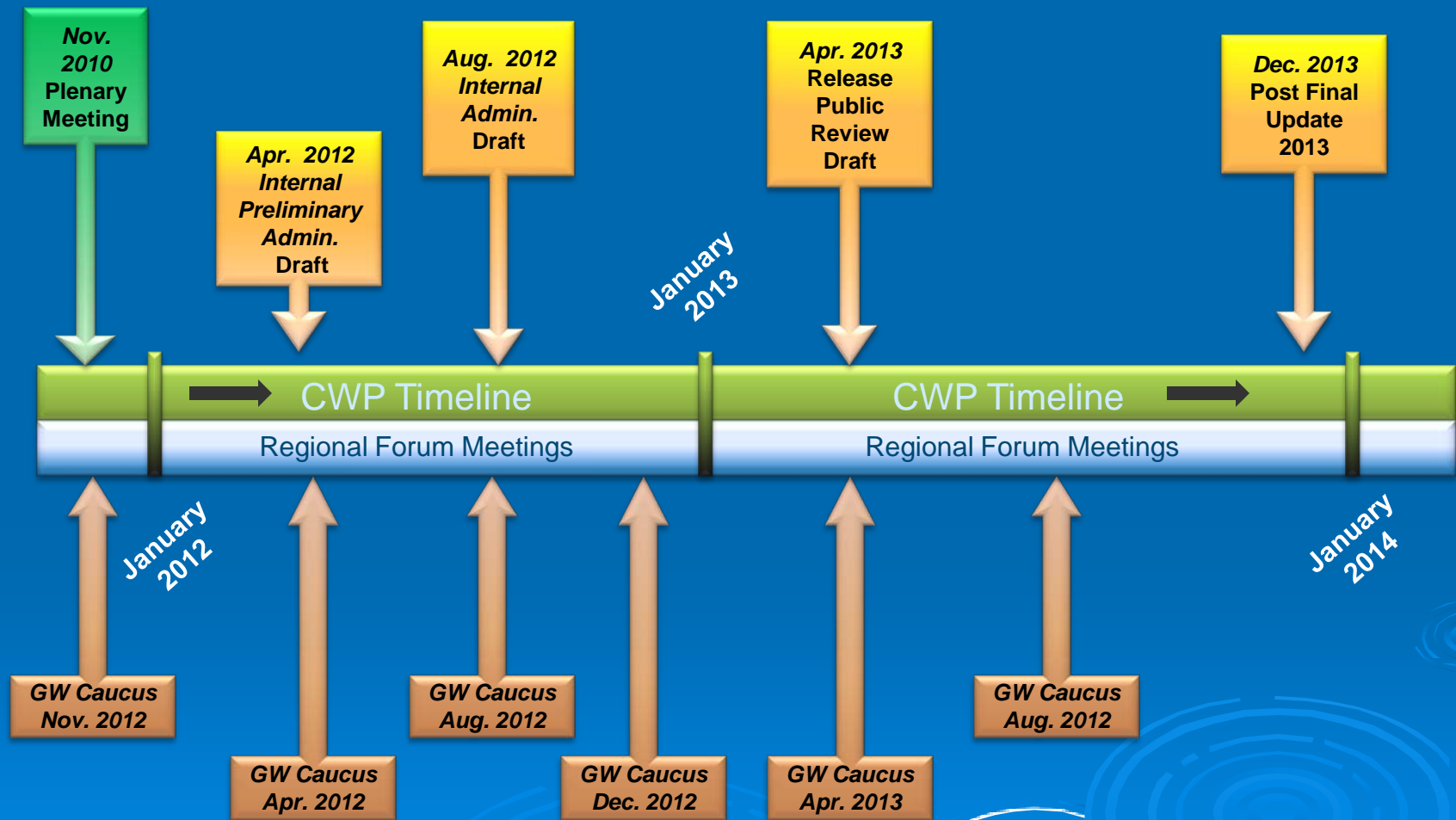
Task 2 Status:

2.3 Overview & status of GW management activities

- Developed review template for evaluating status of GWMPs
- Coordinating with ACWA to survey members as to the status of GWMPs and current groundwater management activities.
- Soliciting feedback from Region Forums, IRWM groups, and compiling references on conjunctive use, recharge, and water banking activities.
- Coordinating with CASGEM program reviews to identify monitoring entities and groundwater monitoring plans.
- Coordinating with SBx7-7 program to update status of Urban and Agricultural WMPs

CWP Plan Update 2013

Partial Timeline and Deliverables



Deliverables 1 & 2

Questions and Group Member Discussion

- How do we resolve overlapping management plan boundaries and data gaps?
- Does the report organization seem workable?
- Content development...how can you or your staff help contribute?

Topics for Discussion

Policy/Guidance Related:

1. What in your view are some of the options to organize, synthesize, and report the groundwater content developed?

Topics for Future Caucus:

2. What other content related to groundwater would you like to see developed going forward in the next Water Plan Update (2018)?

Informational:

1. Are you or your staff willing to participate in developing the groundwater content? Please provide contact information (name, organization, email, and telephone number).
2. Can you recommend local, regional, State, and federal agencies resource persons who may be willing to participate in developing the groundwater content? What is the contact information (name, organization, email, and telephone number)?

